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A COSMIC X-RAY ASTRONOMY BIBLIOGRAPHY: THE ASTROPHYSICAL JOURNAL, 1962 to 1972

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This report presents the results of a survey of the Astrophysical Journal for the time period January 1962 through March 1972 (volumes 135-172). Some 395 references are contained within this document related to cosmic X-ray astronomy.

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A COSMIC X-RAY ASTRONOMY BIBLIOGRAPHY: THE ASTROPHYSICAL JOURNAL, 1962 to 1972

SUMMARY

This report presents the results of a survey of the Astrophysical Journal for the time period January 1962 through March 1972 (volumes 135-172). Some 395 references are contained within this document related to cosmic X-ray astronomy.

The style of this report is that of the bibliography. That is, the main body is divided into three sections: (1) Part I — Author - Title Bibliography; (2) Part II — Author Index to Part I; and (3) Part III — Subject Index to Part I. Also included as Appendix A — Volume - Page Bibliography is a convenient listing of articles by volume-page (or by year).

It is to be emphasized that this document is a strict bibliography, thus, yielding only bibliographic information. It is not annotated as in previous bibliography summaries by the author [1, 2]. Also, it should be stressed that this work represents only one scientific journal — The Astrophysical Journal — and for only the time period since 1962, the inception year for the study of cosmic X rays. Similar reports for the same time frame for other journals are envisioned.

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[1] Wilson, R. M.; Reynolds, J. M., and Fields, S. A.: A Stellar X-Ray Astronomy Summary and Bibliography. NASA TM X-53952, October 21, 1969.

[2] Wilson, R. M.; Reynolds, J. M., and Fields, S. A.: A Solar X-Ray Astonomy Summary and Bibliography. NASA TM X-53991, January 1970.

INTRODUCTION

The detection and study of cosmic X rays is a most recent phenomenon. It was just ten years ago when the pioneer studies of Drs. Giacconi, Gursky, Paolini, and Rossi [3] were first performed to detect the existence of cosmic X rays, X rays originating from outside the solar system.

Over the years many studies and experiments have been performed. The X-ray observations were chiefly carried out by rockets and balloons. The ground-based optical and radio observations were attempted to correlate X-ray emission regions with known visual or radio components. The results of these studies have shown the existence of a large number of X-ray-emitting regions, some stellar in origin, resolved against a diffuse, nearly isotropic background. The list of X-ray objects now numbers more than one hundred, owing chiefly to the use of satellite observation and improved observing and positioning techniques. Some of the X-ray emitters are indeed identifiable with known visual and radio components. For example, Taurus X-1 is identifiable with the Crab Nebula (M1), a supernova remnant (SN 1054) in the constellation Taurus that contains a pulsar (NP 0532) at its center; Scorpius X-1 is a 12th to 13th magnitude blue, star-like object in the constellation Scorpius; and Virgo X-1 is the radio galaxy M87 in Virgo. Other X-ray objects have been correlated with Seyfert galaxies (NGC 1275), QSO's (3C 273), and normal galaxies (LMC); also, one object (Cen X-3) exhibits a light curve similar to that of an eclipsing binary star.

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[3] Giacconi, R.; Gursky, H.; Paolini, F. and Rossi, B.: Evidence for X-Rays from Sources Outside the Solar System. Phys. Rev., Vol. 9, 1962, pp. 439-443.

Because cosmic X-ray astronomy is a relatively new discipline, its rate of growth — that is, the total number of papers related to cosmic X-ray astronomy — has been rather substantial. Of the 395 references included within this bibliographic text, 126 are dated since 1970; 251 are dated since 1968. Because cosmic X-ray astronomy has evolved rather rapidly and because of its importance in astrophysical and astronomical analysis and interpretation, a comprehensive bibliography of all the articles published in the scientific journals related to cosmic X-ray astronomy should be available. With this purpose in mind, this report represents a beginning.

The author recently completed a survey of the Astrophysical Journal for the time period January 1962 through March 1972 (volumes 135-172) for the purpose of determining all articles related to cosmic X-ray astronomy. Thus, included in this compilation are all articles and items which contain some reference to cosmic X-ray observation or theory, whether or not the main purpose of the article concerned X-ray observations. Three hundred and ninety-five references were determined and are included in this bibliography.

The style of this report is like that of most bibliographies— that is, it is divided into three main sections. Part I — Author-Title Bibliography lists the references alphabetically by the authors' names and the title of the article or item. Part II — Author Index to Part I identifies all the authors listed in Part I and their works. It also is in alphabetical order by author's name. Part III — Subject Index to Part I provides the reader with an

outline of topics that are discussed in the articles listed in Part I. In Parts II and III the numbers appearing after the author's name or after the subject topic refer to the numerical listing in Part I. For example, "O'Dell, C. R. - 281" refers the reader to reference number 281 in Part I. The reader would find the reference "281. O'Dell, C. R.: Positional Correlations of Galactic Objects and X-Ray Sources. Vol. 147, 1967, pp. 855-857." Similarly, in the subject index "Epsilon Aurigae - 387" refers the reader to reference number 387 in Part I. The reader would then find reference "387. Wilson, R. E.: A Model of Epsilon Aurigae. Vol. 170, 1971, pp. 529-539."

A fourth section is also included in this report. Appendix A — Volume-Page Bibliography is a convenient listing of all the articles and items referenced in Part I by volume-page (or by year). In this section it is quite simple to determine the total number of papers related to cosmic X-ray astronomy published each year for this particular journal.

It is emphasized that this bibliography concerns itself with only one journal — the Astrophysical Journal — for a certain period of time, 1962 to 1972, and on a particular topic, cosmic X-ray related papers. It is a "strict" bibliography, not of the annotated style.

In conclusion, the author again states that this bibliography is only a beginning toward the desired goal of obtaining a truly comprehensive listing of cosmic X-ray related papers of the major scientific journals. Similar reports are, therefore, envisioned.

PART I

AUTHOR-TITLE BIBLIOGRAPHY

Page Intentionally Left Blank

1. Ables, J. G.: Possible Time Variation of the Radio Emission from Sco X-1. Vol. 155, 1969, pp. L27-L30.

2. Acton, L. W.; Catura, R. C.; Culhane, J. L. and Fisher, P.C.: X-Ray Line Emission from Scorpius X-1. Vol. 161, 1970, pp. L175-L179.

3. Allen, R. J.: The Absorption of Non-Thermal Radio Radiation in Thermal X-Ray Sources. Vol. 153, 1968, pp. 389-396.

4. Andrew, B. H. and Kraus, J. D.: Radio Sources with Flat Spectra. Vol. 159, 1970, pp. L45-L49.

5. Andrew, B. H.; Purton, C. R.; Rappaport, S.; Bradt, H. and Schnopper, H. W.: A Search for Radio Emission from Four X-Ray Sources Near Sagittarius. Vol. 161, 1970, pp. L173-L174.

6. Angel, J. R. P.: Polarization of Thermal X-Ray Sources. Vol. 158, 1969, pp. 219-224.

7. Angel, J. R. P.; Kestenbaum, H. and Novick, R.: Evidence of High-Frequency Oscillations in the X-Ray Flux from Scorpius X-1. Vol. 169, 1971, pp. L57-L61.

8. Arons, J.: Low-Mass Protogalaxies and Absorption Lines in Quasi-Stellar Objects. Vol. 172, 1972, pp. 553-562.

9. Arons, J.: Radiative Transfer of Isotropic X-Rays and Gamma Rays. I. General Theory and Solutions for a Uniform Medium. Vol. 164, 1971, pp. 437-455.

10. Arons, J.: Radiative Transfer of Isotropic X-Rays and Gamma Rays. II. High Energy Radiation in the Expanding Universe. Vol. 164, 1971, pp. 457-468.

11. Arons, J. and McCray, R.: Interaction of Cosmic Gamma Rays with Intergalactic Matter. Vol. 158, 1969, pp. L91-L95.

12. Arons, J.; McCray, R. and Silk, J.: Interaction of Fast Particles with Intergalactic Matter. Vol. 170, 1971, pp. 431-447.

13. Bahcall, J. N.; Kozlovsky, B. and Salpeter, E. E.: On the Time Dependence of Emission-Line Strengths from a Photoionized Nebula. Vol. 171, 1972, pp. 467-482.

14. Bahcall, J. N.; Rees, M. J. and Salpeter, E. E.: Extragalactic Pulsars. Vol. 162, 1970, pp. 737-742.

15. Bahcall, J. N. and Wolf, R. A.: An Observational Test of Theories of Neutron-Star Cooling. Vol. 142, 1965, pp. 1254-1256.

16. Baxter, A. J.; Wilson, B. G. and Green, D. W.: The Diffuse X-Radiation Spectrum Below 4 keV. Vol. 155, 1969, pp. L145-L148.

17. Becklin, E. E.; Frogel, J. A.; Kleinmann, D. E.; Neugebauer, G.; Ney, E. P. and Strecker, D. W.: Infrared Observations of the Core of Centaurus A, NGC 5128. Vol. 170, 1971, pp. L15-L19.

18. Becklin, E. E. and Kleinmann, D. E.: Infrared Observations of the Crab Nebula. Vol. 152, 1968, pp. L25-L30.

19. Belian, R. D.; Conner, J. P. and Evans, W. D.: A Probable Precursor to the X-Ray Nova Centaurus XR-4. Vol. 171, 1972, pp. L87-L90.

20. Bingham, R. G. and Clark, C. D.: High-Energy X-Rays from Cygnus XR-1. Vol. 158, 1969, pp. 207-218.

21. Blanco, V.; Kunkel, W. and Hiltner, W. A.: Spectrum of an Ultraviolet Object in Sagittarius. Vol. 152, 1968, p. L137.

22. Blanco, V.; Kunkel, W.; Hiltner, W. A.; Chodil, G.; Mark, H; Rodrigues, R.; Seward, F. and Swift, C. D.: Spectrum of the Central Star in NGC 5189. Vol. 152, 1968, pp. L135-L136.

23. Blanco, V.; Kunkel, W.; Hiltner, W. A.; Lynga, G.; Bradt, H.; Clark, G.; Naranan, S.; Rappaport, S. and Spada, G.: An Optical Search for X-Ray Sources in Sagittarius. Vol. 152, 1968, pp. 1015-1017.

24. Bleach, R. D.; Boldt, E. A.; Holt, S. S.; Schwartz, D. A. and Serlemitsos, P. J.: X-Ray Spectra of Discrete Sources in Cygnus. Vol. 171, 1972, pp. 51-54.

25. Bleeker, J. A. M.; Burger, J. J.; Deerenberg, A. J. M.; Scheepmaker, A.; Swanenburg, B. N. and Tanaka, Y.: Balloon Observation of the X-Ray Sources in the Cygnus Region in the Energy Range 20-130 keV. Vol. 147, 1967, pp. 391-394.

26. Bleeker, J. A. M. and Deerenberg, A. J. M.: The Diffuse Cosmic X-Ray Background from 20 to 220 keV. Vol. 159, 1970, pp. 215-228.

27. Bless, R. C.; Fischel, D. and Stecher, T. P.: Of and Wolf-Rayet Stars as X-Ray Sources. Vol. 151, 1968, pp. L117-L119.

28. Blumenthal, G. R.; Drake, G. W. F. and Tucker, W. H.: Ratio of Line Intensities in Helium-Like Ions as a Density Indicator. Vol. 172, 1972, pp. 205-212.

29. Boldt, E. A.; Desai, U. D. and Holt, S. S.: 2-20 keV Spectrum of X-Rays from the Crab Nebula and the Diffuse Background Near Galactic Anticenter. Vol. 156, 1969, pp. 427-436.

30. Boldt, E. A.; Desai, U. D.; Holt, S. S. and Serlemitsos, P. J.: A Limit on Line Emission in the X-Ray Background at High Galactic Latitudes. Vol. 167, 1971, pp. L1-L2.

31. Boldt, E. A.; Holt, S. S. and Serlemitsos, P. J.: Search for Temporal Structure in X-Rays from Scorpius X-1. Vol. 164, 1971, pp. L9-L13.

32. Boldt, E. and Serlemitsos, P.: Cosmic X-Ray Bremsstrahlung Associated with Suprathermal Protons. Vol. 157, 1969, pp. 557-562.

33. Boldt, E. and Serlemitsos, P.: Erratum: "Cosmic X-Ray Bremsstrahlung Associated with Suprathermal Protons." Vol. 161, 1970, p. 375.

34. Bowyer, S.: An Alternate Interpretation of the Paper "Stellar X-Ray Emission," by P. C. Fisher and A. J. Meyerott. Vol. 140, 1964, pp. 820-821.

35. Bowyer, C. S.; Lampton, M.; Mack, J. and De Mendonca, F.: Detection of X-Ray Emission from 3C 273 and NGC 5128. Vol. 161, 1970, pp. L1-L7.

36. Bradt, H.; Mayer, W.; Naranan, S.; Rappaport, S. and Spada, G.: Evidence for X-Radiation from the Radio Galaxy M87. Vol. 150, 1967, pp. L199-L206.

37. Bradt, H.; Naranan, S.; Rappaport, S. and Spada, G.: Celestial Positions of X-Ray Sources in Sagittarius. Vol. 152, 1968, pp. 1005-1013.

38. Brandt, J. C. and Roosen, R. G.: Messier 87: The Galaxy of Greatest Known Mass. Vol. 156, 1969, pp. L59-L61.

39. Brecher, K. and Morrison, P.: Cosmology, Black-Body Radiation, and the Diffuse X-Ray Background. Vol. 150, 1967, pp. L61-L64.

40. Brecher, K. and Silk, J.: Lemaître Universe, Galaxy Formation and Observations. Vol. 158, 1969, pp. 91-102.

41. Brini, D.; Ciriegi, U.; Fuligni, F.; Moretti, E. and Vespignani, G.: Cosmic X-Ray Sources in the 20-180 keV Energy Range. Vol. 149, 1967, pp. 429-433.

42. Brown, R. L.: On the Photoionization of Hydrogen and Helium. Vol. 164, 1971, pp. 387-388.

43. Brown, R. L.: Production of the Diffuse Background X-Ray Flux at 44 Å by Suprathermal Proton Bremsstrahlung. Vol. 159, 1970, pp. L187-L192.

44. Bunner, A. N.; Coleman, P. L.; Kraushaar, W. L. and McCammon, D.: Low-Energy Diffuse X-Rays. Vol. 167, 1971, pp. L3-L8.

45. Bunner, A. N.; Coleman, P. L.; Kraushaar, W. L. and McCammon, D.: Soft X-Rays from the Vicinity of the North Polar Spur. Vol. 172, 1972, pp. L67-L72.

46. Bunner, A. N. and Palmieri, T. M.: A New X-Ray Source in the Constellation Ara. Vol. 158, 1969, pp. L35-L36.

47. Burbidge, E. M.; Lynds, C. R. and Stockton, A. N.: On the Binary Nature of Cyg X-2. Vol. 150, 1967, pp. L95-L97.

48. Burbidge, G. R.: Compact Nonthermal Sources in M87. Vol. 159, 1970, pp. L105-L108.

49. Burginyon, G. A.; Grader, R. J.; Hill, R. W.; Price, R. E.; Rodrigues, R.; Seward, F. D.; Swift, C. D.; Hiltner, W. A. and Mannery, E. J.: Scorpius XR-1: Some X-Ray and Optical Observations (1969 May). Vol. 161, 1970, pp. 987-995.

50. Cathey, L. R. and Hayes, J. E.: Interstellar Reddening in the Field of Cyg X-2. Vol. 151, 1968, pp. L89-L92.

51. Cavaliere, A.; Morrison, P. and Pacini, F.: A Model for the Radiations from the Compact Strong Sources. Vol. 162, 1970, pp. L133-L138.

52. Cavaliere, A.; Morrison, P. and Wood, K.: On Quasar Evolution. Vol. 170, 1971, pp. 223-231.

53. Cavaliere, A. and Pacini, F.: Supernova Remnants and Hidden Pulsars. Vol. 159, 1970, pp. L21-L24.

54. Chaisson, E. J. and Goad, L. E.: Low-Energy X-Rays Ruled Out as Interstellar Ionizing Mechanism Toward K3-50. Vol. 171, 1972, pp. L61-L65.

55. Chiu, H. Y. and Canuto, V.: Theory of Radiation Mechanisms of Pulsars. I. Vol. 163, 1971, pp. 577-594.

56. Chodil, G.; Mark, H.; Rodrigues, R.; Seward, F. D. and Swift, C. D.: X-Ray Intensities and Spectra from Several Cosmic Sources. Vol. 150, 1967, pp. 57-65.

57. Chodil, G.; Mark, H.; Rodrigues, R.; Seward, F. D.; Swift, C. D.; Turiel, I.; Hiltner, W. A.; Wallerstein, G. and Mannery, E. J.: Simultaneous Observations of the Optical and X-Ray Spectra of Sco XR-1. Vol. 154, 1968, pp. 645-654.

58. Chodil, G.; Mark, H.; Rodrigues, R. and Swift, C. D.: Nova-Like Behavior of the X-Ray Source Centaurus XR-2. Vol. 152, 1968, pp. L45-L48.

59. Chodil, G.; Mark, H.; Rodrigues, R. and Swift, C. D.: Observation of the Cygnus Region with a Balloon-Borne X-Ray Detector. Vol. 151, 1968, pp. L1-L3.

60. Clark, G. W.; Garmire, G. P. and Kraushaar, W. L.: Observation of High-Energy Cosmic Gamma Rays. Vol. 153, 1968, pp. L203-L207.

61. Clark, G. W.; Lewin, W. H. G. and Smith, W. B.: Sky Survey of High-Energy Cosmic X-Rays and Spectra of the Sources in the Crab Nebula and Cygnus. Vol. 151, 1968, pp. 21-32.

62. Clayton, D. D.; Colgate, S. A. and Fishman, G. J.: Gamma-Ray Lines from Young Supernova Remnants. Vol. 155, 1969, pp. 75-82.

63. Clayton, D. D. and Craddock, W. L.: Radioactivity in Supernova Remnants. Vol. 142, 1965, pp. 189-200.

64. Clayton, D. D. and Silk, J.: Measuring the Rate of Nucleosynthesis with a Gamma-Ray Detector. Vol. 158, 1969, pp. L43-L48.

65. Coleman, P. L.; Bunner, A. N.; Kraushaar, W. L. and McCammon, D.: X-Ray Observation of a New Soft Source in Cygnus. Vol. 170, 1971, pp. L47-L49.

66. Conner, J. P.; Evans, W. D. and Belian, R. D.: The Recent Appearance of a New X-Ray Source in the Southern Sky. Vol. 157, 1969, pp. L157-L159.

67. Cooke, B. A.; Pounds, K. A.; Stewardson, E. A. and Adams, D. J.: A Cosmic X-Ray Survey in the Southern Hemisphere. Vol. 150, 1967, pp. L189-L191.

68. Coppi, B. and Ferrari, A.: Collective Modes of Plasma Surrounding a Collapsed Star. Vol. 161, 1970, pp. L65-L69.

69. Coppi, B. and Treeves, A.: Plasma Model for Thermal X-Ray Sources. Vol. 167, 1971, pp. L9-L13.

70. Cox, D. P. and Daltabuit, E.: Radiative Cooling of a Low-Density Plasma. Vol. 167, 1971, pp. 113-117.

71. Cunningham, C.; Groves, D.; Price, R.; Rodrigues, R.; Swift, C. and Mark, H.: Solar X-Ray and Diffuse Cosmic X-Ray Spectra Measured with a Satellite-Borne Instrument. Vol. 160, 1970, pp. 1177-1183.

72. Davidson, K.: Photoionization and the Emission-Line Spectra of Quasi-Stellar Objects. Vol. 171, 1972, pp. 213-231.

73. Davidson, K.; Pacini, F. and Salpeter, E. E.: A Cocoon Pulsar Model for Scorpius X-1. Vol. 168, 1971, pp. 45-55.

74. Davison, K. and Tucker, W.: Radiative Ionization of the Filaments in the Crab Nebula. Vol. 161, 1970, pp. 437-449.

75. Davison, P. J. N.; Buselli, G.; Clancy, M. C. and Thomas, R. M.: Weak X-Ray Sources in the Southern Hemisphere. Vol. 167, 1971, pp. 479-486.

76. De Young, D. S.: The Dynamics of Extended Extragalactic Radio Sources. Vol. 167, 1971, pp. 541-551.

77. Demoulin, M. and Burbidge, G. R.: Non-Thermal Optical Radiation from Galaxies. Vol. 154, 1968, pp. 3-20.

78. Dicke, R. H.: Scatter-Hole Cameras for X-Rays and Gamma Rays. Vol. 153, 1968, pp. L101-L106.

79. Downs, G. S. and Thompson, A. R.: The Distribution of Polarization in the Crab Nebula at a Wavelength of 9.8 cm. Vol. 152, 1968, pp. L65-L69.

80. Eggen, O. J.: Sco XR-1 as a Member of the Upper Scorpius Complex. Vol. 158, 1969, pp. L31-L34.

81. Eggen, O. J.; Freeman, K. C. and Sandage, A.: On the Optical Identification of the X-Ray Source Cen XR-2 as WX Cen. Vol. 154, 1968, pp. L27-L31.

82. Eggen, O. J. and Lyngå, G.: Blue Objects Near Cen XR-2. Vol. 153, 1968, pp. L195-L197.

83. Eggen, O. J. and Rodgers, A. W.: Identification of S5003 Cen with the New Intense X-Ray Source in Centaurus. Vol. 158, 1969, pp. L111-L112.

84. Elliot, J. L.; Horowitz, P.; Liller, W.; Papaliolios, C. and Veverka, J.: A Search for an Optical Source at the Position of Centaurus XR-3. Vol. 168, 1971, pp. L95-L96.

85. Evans, W. D.; Belian, R. D. and Conner, J. P.: Observations of the Development and Disappearance of the X-Ray Source Centaurus XR-4. Vol. 159, 1970, pp. L57-L60.

86. Evans, W. D.; Belian, R. D.; Conner, J. P.; Strong, I. B.; Hiltner, W. A. and Kunkel, W. E.: X-Ray and Optical Variations of Scorpius X-1. Vol. 162, 1970, pp. L115-L119.

87. Fazio, G.G.; Helmken, H. F.; Rieke, G. H. and Weekes, T. C.: A Search for Discrete Sources of Cosmic Gamma Rays of Energies Near 2×10^{12} eV. Vol. 154, 1968, pp. L83-L89.

88. Fazio, G. G.; Stecker, F. W. and Wright, J. P.: Cosmic Black-Body Radiation, High-Energy Electrons, and the Origin of Isotropic X-Ray and Gamma Radiation. Vol. 144, 1966, pp. 611-614.

89. Feast, M. W.: Radial Velocities of the X-Ray Candidate Star S5003 Centauri. Vol. 160, 1970, pp. L171-L172.

90. Felten, J. E.: The Radiation and Physical Properties of the M87 Jet. Vol. 151, 1968, pp. 861-879.

91. Felten, J. E.; Arp, H. C. and Lynds, C. R.: The M87 Jet. II. Temperature, Ionization, and X-Radiation in a Secondary-Production Model. Vol. 159, 1970, pp. 415-423.

92. Felten, J. E.; Gould, R. J.; Stein, W. A. and Woolf, N. J.: X-Rays from the Coma Cluster of Galaxies. Vol. 146, 1966, pp. 955-958.

93. Felten, J. E. and Morrison, P.: Omnidirectional Inverse Compton and Synchrotron Radiation from Cosmic Distributions of Fast Electrons and Thermal Photons. Vol. 146, 1966, pp. 686-708.

94. Fichtel, C. E.; Hartman, R. C.; Kniffen, D. A. and Sommer, M.: Gamma-Ray Observations of the Galactic Center and Some Possible Point Sources. Vol. 171, 1972, pp. 31-40.

95. Fichtel, C. E.; Kniffen, D. A. and Ögelman, H. B.: Results of Gamma-Ray Balloon Astronomy. Vol. 158, 1969, pp. 193-206.

96. Fichtel, C. E.; Kniffen, D. A. and Ögelman, H. B.: Erratum: "Results of Gamma-Ray Balloon Astronomy." Vol. 168, 1971, p. 581.

97. Field, G. B.: Thermal Instability. Vol. 142, 1965, pp. 531-567.

98. Field, G. B. and Henry, R. C.: Free-Free Emission by Intergalactic Hydrogen. Vol. 140, 1964, pp. 1002-1012.

99. Finzi, A.: Neutron Stars as a Possible Source of X-Rays from Outside the Solar System. Vol. 139, 1964, pp. 1398-1399.

100. Finzi, A. and Wolf, R. A.: Hot, Vibrating Neutron Stars. Vol. 153, 1968, pp. 835-848.

101. Fisher, P. C.; Johnson, H. M.; Jordan, W. C.; Meyerott, A. J. and Acton, L. W.: Observations of Cosmic X-Rays. Vol. 143, 1966, pp. 203-217.

102. Fisher, P. C.; Jordan, W. C.; Meyerott, A. J.; Acton, L. W. and Roethig, D. T.: Observations of Galactic X-Ray Sources. Vol. 151, 1968, pp. 1-19.

103. Fisher, P. C.; Jordan, W. C.; Meyerott, A. J.; Acton, L. W. and Roethig, D. T.: X-Ray Spectra of Several Cosmic Sources. Vol. 147, 1967, pp. 1209-1213.

104. Fisher, P. C. and Meyerott, A. J.: Reply to Letter of Stuart Bowyer. Vol. 140, 1964, pp. 821-823.

105. Fisher, P. C. and Meyerott, A. J.: Stellar X-Ray Emission. Vol. 139, 1964, pp. 123-142.

106. Fishman, G. J.: Cosmic-Ray Effects on Diffuse Gamma-Ray Measurements. Vol. 171, 1972, pp. 163-167.

107. Fishman, G. J.; Harnden, Jr., F. R. and Haymes, R. C.: Observation of Pulsed Hard X-Radiation from NP 0532 from 1967 Data. Vol. 156, 1969, pp. L107-L110.

108. Fishman, G. J.; Harnden, Jr., F. R.; Johnson III, W. N. and Haymes, R. C.: The Period and Hard-X-Ray Spectrum of NP 0532 in 1967. Vol. 158, 1969, pp. L61-L64.

109. Fishman, G. J.; Harnden, Jr., F. R.; Johnson III, W. N. and Haymes, R. C.: Erratum: "The Period and Hard-X-Ray Spectrum of NP 0532 in 1967." Vol. 160, 1970, p. L117.

110. Fowler, W. A.; Reeves, H. and Silk, J.: Spallation Limits on Interstellar Fluxes of Low-Energy Cosmic Rays and Nuclear Gamma Rays. Vol. 162, 1970, pp. 49-56.

111. Friedman, H. and Byram, E. T.: X-Rays from the Coma Cluster of Galaxies. Vol. 147, 1967, pp. 399-401.

112. Fritz, G.; Davidsen, A.; Meekins, J. F. and Friedman, H.: Discovery of an X-Ray Source in Perseus. Vol. 164, 1971, pp. L81-L85.

113. Fritz, G.; Meekins, J. F.; Chubb, T. A. and Friedman, H.: The X-Ray Spectra of the Crab Nebula and NP 0532. Vol. 164, 1971, pp. L55-L60.

114. Fritz, G.; Meekins, J. F.; Henry, R. C.; Byram, E. T. and Friedman, H.: Soft X-Rays from Scorpius XR-1. Vol. 153, 1968, pp. L199-L202.

115. Fritz, G.; Meekins, J. F.; Henry, R. C. and Friedman, H.: On X-Ray Line Emission from Scorpius XR-1. Vol. 156, 1969, pp. L33-L36.

116. Frye, Jr., G. M. and Wang, C. P.: Survey of Possible Sources of Cosmic Gamma Rays Above 50 MeV in the Northern Hemisphere. Vol. 158, 1969, pp. 925-937.

117. Gatewood, G. and Sofia, S.: Physical Characteristics of Sco X-1. Vol. 154, 1968, pp. L69-L70.

118. Gebel, W. L. and Shore, S. N.: On the Nature of the Monoceros Supernova Remnant. Vol. 172, 1972, pp. L9-L12.

119. Giacconi, R.; Gorenstein, P.; Gursky, H.; Usher, P. D.; Waters, J. R.; Sandage, A.; Osmer, P. and Peach, J. V.: On the Optical Search for the X-Ray Sources Cyg X-1 and Cyg X-2. Vol. 148, 1967, pp. L129-L132.

120. Giacconi, R.; Gorenstein, P.; Gursky, H. and Waters, J. R.: An X-Ray Survey of the Cygnus Region. Vol. 148, 1967, pp. L119-L127.

121. Giacconi, R.; Gorenstein, P.; Gursky, H. and Waters, J. R.: Erratum: "An X-Ray Survey of the Cygnus Region." Vol. 149, 1967, p. L85.

122. Giacconi, R.; Gursky, H.; Kellogg, E.; Schreier, E. and Tananbaum, H.: Discovery of Periodic X-Ray Pulsations in Centaurus X-3 from Uhuru. Vol. 167, 1971, pp. L67-L73.

123. Giacconi, R.; Kellogg, E.; Gorenstein, P.; Gursky, H. and Tananbaum, H.: An X-Ray Scan of the Galactic Plane from Uhuru. Vol. 165, 1971, pp. L27-L35.

124. Glass, I. S.: Observations of X-Rays from Taurus X-1 and Cygnus X-1. Vol. 157, 1969, pp. 215-222.

125. Goldreich, P. and Julian, W. H.: Pulsar Electrodynamics. Vol. 157, 1969, pp. 869-880.

126. Goldsmith, D. and Silk, J.: Intergalactic Clouds in the Coma Cluster?. Vol. 172, 1972, pp. 563-575.

127. Goldsmith, D. W.; Habing, H. J. and Field, G. B.: Thermal Properties of Interstellar Gas Heated by Cosmic Rays. Vol. 158, 1969, pp. 173-183.

128. Goldwire, Jr., H. C. and Michel, F. C.: Analysis of the Slowing-Down Rate of NP 0532. Vol. 156, 1969, pp. L111-L114.

129. Gordon, M. A.: Radiation Transfer of Radio Recombination Lines in the Diffuse Interstellar Medium. Vol. 167, 1971, pp. 21-25.

130. Gordon, M. A. and Gottesman, S. T.: Electron Density and Temperature in the Diffuse Interstellar Medium Determined from Recombination Lines. Vol. 168, 1971, pp. 361-371.

131. Gorenstein, P.; Giacconi, R. and Gursky, H.: The Spectra of Several X-Ray Sources in Cygnus and Scorpio. Vol. 150, 1967, pp. L85-L94.

132. Gorenstein, P.; Giacconi, R. and Gursky, H.: X-Ray Spectral Data from GX3+1. Vol. 157, 1969, pp. 463-464.

133. Gorenstein, P.; Gursky, H. and Garmire, G.: The Analysis of X-Ray Spectra. Vol. 153, 1968, pp. 885-897.

134. Gorenstein, P.; Gursky, H.; Kellogg, E. M. and Giacconi, R.: An X-Ray Survey of the Cassiopeia Region and Its Implications Concerning Supernova Remnants and the Galactic Source Distribution. Vol. 160, 1970, pp. 947-957.

135. Gorenstein, P.; Harris, B. and Gursky, H.: Upper Limits to the Soft X-Ray Emission of Sources in Virgo. Vol. 172, 1972, pp. L41-L45.

136. Gorenstein, P.; Kellogg, E. M. and Gursky, H.: The Spectrum of Diffuse Cosmic X-Rays, 1-13 keV. Vol. 156, 1969, pp. 315-324.

137. Gorenstein, P.; Kellogg, E. M. and Gursky, H.: X-Ray Characteristics of Three Supernova Remnants. Vol. 160, 1970, pp. 199-208.

138. Goss, W. M. and Shaver, P. A.: A Radio Source Near the X-Ray Source GX3+1. Vol. 154, 1968, pp. L75-L76.

139. Gott III, J. R. and Gunn, J. E.: The Coma Cluster as an X-Ray Source: Some Cosmological Implications. Vol. 169, 1971, pp. L13-L15.

140. Gottesman, S. T. and Gordon, M. A.: Radio Recombination Lines from Diffuse Interstellar Gas. Vol. 162, 1970, pp. L93-L97.

141. Gould, R. J. and Burbidge, G. R.: X-Rays from the Galactic Center, External Galaxies, and the Intergalactic Medium. Vol. 138, 1963, pp. 969-977.

142. Gould, R. J. and Ramsay, W.: The Temperature of Intergalactic Matter. Vol. 144, 1966, pp. 587-598.

143. Gould, R. J. and Sciama, D. W.: Cosmic X- and Infrared Rays as Tools for Exploring the Large-Scale Structure of the Universe. Vol. 140, 1964, pp. 1634-1636.

144. Grader, R. J.; Hill, R. W.; Seward, F. D. and Hiltner, W. A.: The Soft X-Ray Spectra of Three Cosmic Sources and Simultaneous Optical Observations of Sco XR-1. Vol. 159, 1970, pp. 201-214.

145. Grader, R. J.; Hill, R. W.; Seward, F. D. and Hiltner, W. A.: Erratum: "The Soft X-Ray Spectra of Three Cosmic Sources and Simultaneous Observations of Sco X-1." Vol. 160, 1970, p. 1193.

146. Grader, R. J.; Hill, R. W. and Stoering, J. P.: Soft X-Rays from the Cygnus Loop. Vol. 161, 1970, pp. L45-L50.

147. Grindlay, J. E.: Flare Stars as X-Ray Sources. Vol. 162, 1970, pp. 187-198.

148. Gunn, J. E. and Peterson, B. A.: On the Density of Neutral Hydrogen in Intergalactic Space. Vol. 142, 1965, pp. 1633-1636.

149. Gursky, H.; Giacconi, R.; Gorenstein, P.; Waters, J. R.; Oda, M.; Bradt, H.; Garmire, G. and Sreekantan, B. V.: A Measurement of the Angular Size of the X-Ray Source Sco X-1. Vol. 144, 1966, pp. 1249-1252.

150. Gursky, H.; Giacconi, R.; Gorenstein, P.; Waters, J. R.; Oda, M.; Bradt, H.; Garmire, G. and Sreekantan, B. V.: Erratum: "A Measurement of the Angular Size of the X-Ray Source Sco X-1." Vol. 145, 1966, p. 968.

151. Gursky, H.; Giacconi, R.; Gorenstein, P.; Waters, J. R.; Oda, M.; Bradt, H.; Garmire, G. and Sreekantan, B. V.: A Measurement of the Location of the X-Ray Source Sco X-1. Vol. 146, 1966, pp. 310-316.

152. Gursky, H.; Gorenstein, P. and Giacconi, R.: The Distribution of Galactic X-Ray Sources from Scorpio to Cygnus. Vol. 150, 1967, pp. L75-L84.

153. Gursky, H.; Gorenstein, P.; Kerr, F. J. and Grayzeck, E. J.: The Estimated Distance to Cygnus X-1 Based on Its Low-Energy X-Ray Spectrum. Vol. 167, 1971, pp. L15-L21.

154. Gursky, H.; Kellogg, E.; Murray, S.; Leong, C.; Tananbaum, H. and Giacconi, R.: A Strong X-Ray Source in the Coma Cluster Observed by Uhuru. Vol. 167, 1971, pp. L81-L84.

155. Gursky, H.; Kellogg, E. M. and Gorenstein, P.: The Location of the X-Ray Source in Vela. Vol. 154, 1968, pp. L71-L74.

156. Gursky, H.; Kellogg, E. M.; Leong, C.; Tananbaum, H. and Giacconi, R.: Detection of X-Rays from the Seyfert Galaxies NGC 1275 and NGC 4151 by the Uhuru Satellite. Vol. 165, 1971, pp. L43-L48.

157. Habing, H. J. and Goldsmith, D. W.: Heating of the Interstellar Medium by X-Rays and Cosmic Rays. Vol. 166, 1971, pp. 525-541.

158. Harnden, Jr., F. R.; Johnson III, W. N. and Haymes, R. C.: Evidence for Hard X-Ray Pulsations from the Vela Pulsar. Vol. 172, 1972, pp. L91-L94.

159. Hartle, J. B. and Thorne, K. S.: Slowly Rotating Relativistic Stars. II. Models for Neutron Stars and Supermassive Stars. Vol. 153, 1968, pp. 807-834.

160. Hawking, S. W. and Ellis, G. F. R.: The Cosmic Black-Body Radiation and the Existence of Singularities in Our Universe. Vol. 152, 1968, pp. 25-36.

161. Haymes, R. C.; Ellis, D. V.; Fishman, G. J.; Glenn, S. W. and Kurfess, J. D.: Detection of Gamma Radiation from the Cygnus Region. Vol. 151, 1968, pp. L125-L129.

162. Haymes, R. C.; Ellis, D. V.; Fishman, G. J.; Glenn, S. W. and Kurfess, J. D.: Detection of Hard X-Radiation from Virgo. Vol. 151, 1968, pp. L131-L134.

163. Haymes, R. C.; Ellis, D. V.; Fishman, G. J.; Glenn, S. W. and Kurfess, J. D.: Observation of Hard Radiation from the Region of the Galactic Center. Vol. 157, 1969, pp. 1455-1459.

164. Haymes, R. C.; Ellis, D. V.; Fishman, G. J.; Glenn, S. W. and Kurfess, J. D.: Search for Gamma Radiation from Centaurus A. Vol. 155, 1969, pp. L31-L34.

165. Haymes, R. C.; Ellis, D. V.; Fishman, G. J.; Kurfess, J. D. and Tucker, W. H.: Observation of Gamma Radiation from the Crab Nebula. Vol. 151, 1968, pp. L9-L14.

166. Haymes, R. C. and Harnden, Jr., F. R.: Low-Energy Gamma Radiation from Cygnus. Vol. 159, 1970, pp. 1111-1114.

167. Haymes, R. C.; Harnden, Jr., F. R.; Johnson III, W. N.; Prichard, H. M. and Bosch, H. E.: The Low-Energy Gamma-Ray Spectrum of Scorpius X-1. Vol. 172, 1972, pp. L47-L49.

168. Heiles, C.: Supernova Shells and Galactic X-Rays. Vol. 140, 1964, pp. 470-476.

169. Henriksen, R. N.; Feldman, P. A. and Chau, W. Y.: Dissipative Processes in Neutron-Star Crusts and the Production of Blackbody X-Ray Sources. Vol. 172, 1972, pp. 717-728.

170. Henry, R. C.: Absence of Lyman-Alpha Emission from the Coma Cluster of Galaxies. Vol. 172, 1972, pp. L97-L100.

171. Henry, R. C.; Fritz, G.; Meekins, J. F.; Chubb, T. and Friedman, H.: Excess Background Radiation of Soft X-Rays at the Galactic Pole and Plane. Vol. 163, 1971, pp. L73-L77.

172. Henry, R. C.; Fritz, G.; Meekins, J. F.; Friedman, H. and Byram, E. T.: Possible Detection of a Dense Intergalactic Plasma. Vol. 153, 1968, pp. L11-L18.

173. Hill, R. W.; Burginyon, G.; Grader, R. J.; Palmieri, T. M.; Seward, F. D. and Stoering, J. P.: A Soft X-Ray Survey from the Galactic Center to Vela. Vol. 171, 1972, pp. 519-528.

174. Hill, R. W.; Grader, R. J. and Seward, F. D.: The Soft X-Ray Spectrum of Sco XR-1. Vol. 154, 1968, pp. 655-660.

175. Hillier, R. R.; Jackson, W. R.; Murray, A.; Redfern, R. M. and Sale, R. G.: Low-Energy Gamma Rays from NP 0532. Vol. 162, 1970, pp. L177-L180.

176. Hiltner, W. A.; Mook, D. E.; Ludden, D. J. and Graham, D.: On the Polarization of Sco X-1. Vol. 148, 1967, pp. L47-L48.

177. Hjellming, R. M. and Wade, C. M.: Radio Emission from X-Ray Sources. Vol. 168, 1971, pp. L21-L24.

178. Hjellming, R. M. and Wade, C. M.: The Radio Sources Associated with Scorpius X-1. Vol. 164, 1971, pp. L1-L7.

179. Hobbs, R. W. and Marionni, P.: Search for 3.5 Millimeter Continuum Radiation from Infrared Stars and Related Objects. Vol. 167, 1971, pp. 85-87.

180. Holt, S. S.; Boldt, E. A.; Schwartz, D. A.; Serlemitsos, P. J. and Bleach, R. D.: Evidence for Multiple Periodicity in the X-Ray Emission from Cygnus X-1. Vol. 166, 1971, pp. L65-L68.

181. Holt, S. S.; Boldt, E. A. and Serlemitsos, P. J.: Iron Line Emission from X-Ray Sources. Vol. 154, 1968, pp. L137-L140.

182. Holt, S. S.; Boldt, E. A. and Serlemitsos, P. J.: Search for Line Structure in the X-Ray Spectrum of Sco X-1. Vol. 158, 1969, pp. L155-L158.

183. Horowitz, P.; Papaliolios, C. and Carleton, N. P.: Results of a Search for Optical Pulsars. Vol. 163, 1971, pp. L5-L10.

184. Houck, J. R. and Harwit, M.: Far-Infrared Nightsky Emission Above 120 Kilometers. Vol. 157, 1969, pp. L45-L48.

185. Hoyle, F.: X-Rays from Outside the Solar System. Vol. 137, 1963, pp. 993-995.

186. Hudson, H. S.; Peterson, L. E. and Schwartz, D. A.: Simultaneous X-Ray and Optical Observations of Sco X-1 Flares. Vol. 159, 1970, pp. L51-L55.

187. Hughes, V. A.; Feldman, P. A. and Woodsworth, A.: Radio Observations of Magnetic White Dwarfs. Vol. 170, 1971, pp. L125-L126.

188. Hunter, C.: The Rotation and Angular Momentum of Galaxies. Vol. 162, 1970, pp. 445-452.

189. Inman, C. L.: Baryon Star Models. Vol. 141, 1965, pp. 187-194.

190. Jackson, P. D. and Kerr, F. J.: Detection of Radio Recombination-Line Emission Associated with Distributed Ionized Hydrogen. Vol. 168, 1971, pp. 29-35.

191. Jenkins, E. B.; Morton, D. C. and Matilsky, T. A.: Interstellar Lα Absorption in β^1, δ and π Scorpii. Vol. 158, 1969, pp. 473-478.

192. Johnson, H. M.: Hβ Photometry of the Night Sky. Vol. 164, 1971, pp. 379-382.

193. Johnson, H. M.: Physical Characteristics of Sco X-1. Vol. 146, 1966, pp. 960-961.

194. Johnson, H. M.: Physical Characteristics of Sco X-1. II. Vol. 147, 1967, pp. 1213-1218.

195. Johnson, H. M.: Physical Characteristics of Sco X-1. III. Vol. 154, 1968, pp. 1139-1141.

196. Johnson, H. M.: The Distribution of X-Ray Sources in the Galaxy. Vol. 143, 1966, pp. 261-263.

197. Johnson, H. M.: The Sky Near the Brightest X-Ray Source in Scorpius. Vol. 144, 1966, pp. 635-638.

198. Johnson, H. M.: The Sky Near the Brightest X-Ray Source in Scorpius. III. Vol. 164, 1971, pp. 67-76.

199. Johnson, H. M. and Golson, J. C.: Narrow-Band and UBV Photometry of GX3+1 and Two Wolf-Rayet Stars. Vol. 154, 1968, pp. L77-L82.

200. Johnson, H. M. and Golson, J. C.: Narrow-Band and UBV Photometry of Sco X-1. Vol. 153, 1968, pp. 307-312.

201. Johnson, H. M. and Golson, J. C.: Narrow-Band Photometry of Five Combination Variable Stars and the X-Ray Source Cyg X-2. Vol. 155, 1969, pp. L91-L96.

202. Johnson, H. M.; Spinrad, H.; Taylor, B. J. and Peimbert, M.: Photoelectric Scanner Spectrophotometry of Sco X-1. Vol. 149, 1967, pp. L45-L50.

203. Johnson, H. M. and Stephenson, C. B.: A Possible Old Nova Near Sco X-1. Vol. 146, 1966, pp. 602-605.

204. Johnson III, W. N.; Harnden, Jr., F. R. and Haymes, R. C.: The Spectrum of Low-Energy Gamma Radiation from the Galactic-Center Region. Vol. 172, 1972, pp. L1-L7.

205. Jones, F. C.: Suprathermal Proton Bremsstrahlung by the Weizsäcker-Williams Method. Vol. 169, 1971, pp. 503-506.

206. Jones, T. W. and Kellogg, P. J.: Limitations on Thermal and Nonthermal Models for the Radiation from Extragalactic Sources. Vol. 172, 1972, pp. 283-298.

207. Kafatos, M. C. and Morrison, P.: Fossil Strömgren Spheres from Supernova Explosions. Vol. 168, 1971, pp. 195-201.

208. Kellogg, E.; Gursky, H.; Leong, C.; Schreier, E.; Tananbaum, H. and Giacconi, R.: X-Ray Observations of the Virgo Cluster, NGC 5128, and 3C 273 from the Uhuru Satellite. Vol. 165, 1971, pp. L49-L54.

209. Kellogg, E.; Gursky, H.; Murray, S.; Tananbaum, H. and Giacconi, R.: X-Ray Sources Near the Galactic Center Observed by Uhuru. Vol. 169, 1971, pp. L99-L103.

210. Kestenbaum, H.; Angel, J. R. P. and Novick, R.: X-Ray Spectrum of Scorpius X-1 Obtained with a Bragg Crystal Spectrometer. Vol. 164, 1971, pp. L87-L93.

211. Kestenbaum, H.; Angel, J. R. P.; Novick, R. and Cocke, W. J.: Correlated Transient Short-Period Oscillation in the Optical and X-Ray Flux from Scorpius X-1. Vol. 169, 1971, pp. L49-L55.

212. Kiang, T.: Jets and Filaments in Haro's Violet Galaxies. Vol. 150, 1967, pp. L31-L32.

213. Kraft, R. P. and Demoulin, M.: On the Remarkable Spectroscopic Complexities of Cyg X-2. Vol. 150, 1967, pp. L183-L188.

214. Kraft, R. P. and Miller, J. S.: Further Spectroscopic Observations of the Optical Object Identified with X-Ray Source Cygnus X-2. Vol. 155, 1969, pp. L159-L161.

215. Krishnan, T.; Zisk, S. H. and Cudaback, D. D.: The Crab Nebula at 1420 MHz. Vol. 150, 1967, pp. 67-77.

216. Kristian, J.; Brucato, R.; Visvanathan, N.; Lanning, H.; Sandage, A.: On the Optical Identification of Cygnus X-1. Vol. 168, 1971, pp. L91-L93.

217. Kristian, J.; Sandage, A. and Westphal, J. A.: Rapid Photometric and Spectroscopic Variations of the X-Ray Source Cyg X-2. Vol. 150, 1967, pp. L99-L105.

218. Kristian, J.; Visvanathan, N.; Westphal, J. A. and Snellen, G. H.: Optical Polarization and Intensity of the Pulsar in the Crab Nebula. Vol. 162, 1970, pp. 475-483.

219. Kunkel, W. E. and Bradt, H. V.: Identification of the Nucleus of NGC 5128. Vol. 170, 1971, pp. L7-L10.

220. Kunkel, W.; Osmer, P.; Smith, M.; Hoag, A.; Schroeder, D.; Hiltner, W. A.; Bradt, H.; Rappaport, S. and Schnopper, H. W.: An Optical Search for the X-Ray Sources GX3+1 GX5-1, GX9+1, and GX17+2. Vol. 161, 1970, pp. L169-L172.

221. Kurfess, J. D.: Observation of Low-Energy Gamma Radiation from NP 0532. Vol. 168, 1971, pp. L39-L42.

222. Lampton, M.; Bowyer, C. S. and Harrington, S.: A Search for Rapid Optical Oscillations in Scorpius XR-1. Vol. 162, 1970, pp. 181-186.

223. Lampton, M.; Bowyer, S.; Mack, J. E. and Margon, B.: X-Ray Observations of Virgo XR-1. Vol. 168, 1971, pp. L1-L6.

224. Lampton, M.; Bowyer, S.; Welch, J. and Grasdalen, G.: Simultaneous Radio and Optical Measurements of Scorpius XR-1. Vol. 164, 1971, pp. L61-L65.

225. Lampton, M.; Margon, B.; Bowyer, S.; Mahoney, W. and Anderson, K.: The X-Ray Spectrum of NGC 5128. Vol. 171, 1972, pp. L45-L50.

226. Landstreet, J. D. and Angel, J. R. P.: The Optical Polarization of Scorpius X-1. Vol. 172, 1972, pp. 443-446.

227. Lawrence, G. M.; Ostriker, J. P. and Hesser, J. E.: Ultrashort-Period Stellar Oscillations. I. Results from White Dwarfs, Old Novae, Central Stars of Planetary Nebulae, 3C 273, and Scorpius XR-1. Vol. 148, 1967, pp. L161-L163.

228. Leong, C.; Kellogg, E.; Gursky, H.; Tananbaum, H. and Giacconi, R.: X-Ray Emission from the Magellanic Clouds Observed by Uhuru. Vol. 170, 1971, pp. L67-L71.

229. Lerche, I.: On the Motion of Current Sheets, and the Radio, Optical, and X-Ray Emission from Pulsars. Vol. 159, 1970, pp. 229-237.

230. Lerche, I.: On the Motion of Current Sheets, and the Radio, Optical, and X-Ray Emission from Pulsars. II. Pulse Structure, Polarization, Time-Varying Features, and Tight-Beam Emission. Vol. 160, 1970, pp. 1003-1017.

231. Lerche, I.: On the Motion of Current Sheets, and the Radio, Optical, and X-Ray Emission from Pulsars. III. The Independent-Particle Picture and Radiation. Vol. 162, 1970, pp. 153-160.

232. Lewin, W. H. G.; Clark, G. W. and Smith, W. B.: Observation of an X-Ray Flare from Sco X-1. Vol. 152, 1968, pp. L55-L61.

233. Lewin, W. H. G.; Clark, G. W. and Smith, W. B.: Observation of Cen XR-2 and Other High-Energy X-Ray Sources in the Southern Sky. Vol. 152, 1968, pp. L49-L53.

234. Lewin, W. H. G.; Clark, G. W. and Smith, W. B.: Spectral Data on Sco X-1 in the Energy Range from 20 to 100 keV. Vol. 150, 1967, pp. L153-L155.

235. Lewin, W. H. G.; McClintock, J. E.; Ryckman, S. G.; Glass, I. S. and Smith, W. B.: Continual Variations in the High-Energy Flux of X-Rays from Scorpius X-1. Vol. 162, 1970, pp. L109-L113.

236. Lewin, W. H. G.; McClintock, J. E.; Ryckman, S. G. and Smith, W. B.: Detection of a High-Energy X-Ray Flare from a Source in Crux. Vol. 166, 1971, pp. L69-L72.

237. Lewin, W. H. G.; McClintock, J. E. and Smith, W. B.: Decrease in the High-Energy X-Ray Flux from Centaurus XR-2. Vol. 159, 1970, pp. L193-L196.

238. Lewin, W. H. G.; Ricker, G. R. and McClintock, J. E.: X-Rays from a New Variable Source GX 1+4. Vol. 169, 1971, pp. L17-L21.

239. Loh, E. D. and Garmire, G. P.: Radiative Transfer in an Ionized Medium at High Temperature. Vol. 166, 1971, pp. 301-309.

240. Lynds, C. R.: Spectroscopic Observations of Cyg X-2. Vol. 149, 1967, pp. L41-L43.

241. Lynds, R.; Maran, S. P. and Trumbo, D. E.: Optical Identification and Observations of the Pulsar NP 0532. Vol. 155, 1969, pp. L121-L125.

242. MacGregor, A.; Seward, F. and Turiel, I.: Observation of Galactic X-Ray Sources 1968 November 3. Vol. 161, 1970, pp. 979-986.

243. Macklin, R. L.: Were the Lightest Stable Isotopes Produced by Photodissociation?. Vol. 162, 1970, pp. 353-355.

244. Manchester, R. N.: Observations of the Crab Pulsar at 410 and 1664 MHz. Vol. 163, 1971, pp. L61-L63.

245. Manley, O. P.: Free-Free Emission as a Source of Galactic X-Rays. Vol. 144, 1966, pp. 628-634.

246. Manley, O. P.: Problems Relating to Magnetic Fields in Neutron Stars. Vol. 147, 1967, pp. 808-810.

247. Manley, O. P.: X-Ray Emission from Sco X-1. Vol. 144, 1966, pp. 1253-1257.

248. Manley, O. P. and Olbert, S.: Models of X-Ray Stars. Vol. 157, 1969, pp. 223-246.

249. Margon, B.; Bowyer, S.; Lampton, M. and Cruddace, R.: Evidence for a Highly Compact X-Ray Source. Vol. 169, 1971, pp. L45-L48.

250. Margon, B.; Lampton, M.; Bowyer, S. and Cruddace, R.: A Pulsing X-Ray Source in Circinus. Vol. 169, 1971, pp. L23-L25.

251. Mark, H.; Price, R.; Rodrigues, R.; Seward, F. D. and Swift, C. D.: Detection of X-Rays from the Large Magellanic Cloud. Vol. 155, 1969, pp. L143-L144.

252. Mark, H.; Price, R. E.; Rodrigues, R.; Seward, F. D.; Swift, C. D. and Hiltner, W. A.: Further Simultaneous Observations of the Optical and X-Ray Spectra of Sco X-1. Vol. 156, 1969, pp. L67-L72.

253. Mark, H.; Price, R.; Rodrigues, R.; Seward, F.; Swift, C. and Hiltner, W.: Erratum: "Further Simultaneous Observations of the Optical and X-Ray Spectra of Sco X-1." Vol. 158, 1969, p. L131.

254. May, T. C. and Waddington, C. J.: A Search for Energetic Gamma-Ray Emission from the Supernova Remnant Cassiopeia A. Vol. 156, 1969, pp. 437-444.

255. Mayer, W.; Bradt, H. V. and Rappaport, S.: Positions of X-Ray Sources in the Sagittarius Region. Vol. 159, 1970, pp. L115-L120.

256. McCammon, D.; Bunner, A. N.; Coleman, P. L. and Kraushaar, W. L.: A Search for Absorption of the Soft X-Ray Diffuse Flux by the Small Magellanic Cloud. Vol. 168, 1971, pp. L33-L37.

257. McClintock, J. E.; Ricker, G. R. and Lewin, W. H. G.: Rapid Fluctuations in the High-Energy X-Ray Flux from a Source in Crux. Vol. 166, 1971, pp. L73-L76.

258. McCray, R.: The Electromagnetic Spectrum of Eta Carinae. Vol. 147, 1967, pp. 544-555.

259. Meekins, J. F.; Henry, R. C.; Fritz, G.; Friedman, H. and Byram, E. T.: X-Ray Spectra of Several Discrete Cosmic Sources. Vol. 157, 1969, pp. 197-213.

260. Meltzer, D. W. and Thorne, K. S.: Normal Modes of Radial Pulsation of Stars at the End Point of Thermonuclear Evolution. Vol. 145, 1966, pp. 514-543.

261. Michel, F. C.: Acceleration of Relativistic Particles in the Crab Nebula. Vol. 157, 1969, pp. 1183-1199.

262. Michel, F. C.: Addendum: "Acceleration of Relativistic Particles in the Crab Nebula." Vol. 161, 1970, p. 801.

263. Miller, J. S. and Mathews, W. G.: The Recombination Spectrum of the Planetary Nebula NGC 7027. Vol. 172, 1972, pp. 593-607.

264. Minkowski, R. and Johnson, H. M.: The Peculiar Nebula NGC 6302. Vol. 148, 1967, pp. 659-662.

265. Miyamoto, S.; Fujii, M.; Matsuoka, M.; Nishimura, J.; Oda, M.; Ogawara, Y.; Ohta, S. and Wada, M.: Measurement of the Location of the X-Ray Source Cygnus X-1. Vol. 168, 1971, pp. L11-L14.

266. Moffet, A. T. and Berge, G. L.: Attempts to Detect Radio Emission from Two Galactic X-Ray Sources. Vol. 153, 1968, pp. 997-1000.

267. Mook, D.; Hiltner, W. A. and Lynds, R.: Spectroscopic Observations of Scorpius X-1. Vol. 163, 1971, pp. L69-L71.

268. Mook, D. E.: UBV Photometry of Sco XR-1. Vol. 150, 1967, pp. L25-L30.

269. Morton, D. C.: Neutron Stars as X-Ray Sources. Vol. 140, 1964, pp. 460-469.

270. Mumford, G. S.: Three-Color Observations of Scorpius X-1, Nova Herculis 1963, Nova GK Persei 1901, and MHα 328-116. Vol. 146, 1966, pp. 962-964.

271. Neugebauer, G. and Oke, J. B.: A Study of Visual and Infrared Observations of Sco XR-1. Vol. 155, 1969, pp. 1-9.

272. Ney, E. P. and Stein, W. A.: Observations of the Crab Nebula at λ = 5800 Å, 2.2 μ , and 3.5 μ with a 4-Minute Beam. Vol. 152, 1968, pp. L21-L24.

273. Niel, M.; Vedrenne, G. and Bouigue, R.: Possible Observation of High-Energy Gamma Rays from the Cygnus Region. Vol. 171, 1972, pp. 529-536.

274. Nikulin, N. S.; Kuvshinov, V. M. and Severny, A. B.: On the Circular Polarization of Some Peculiar Objects. Vol. 170, 1971, pp. L53-L58.

275. Noerdlinger, P. D.: Models for the Stabilization of Clusters of Galaxies by Hot Gas Consistent with Observations of PKS 1116 + 12. Vol. 164, 1971, pp. 217-221.

276. Noerdlinger, P. D.: Quasi-Stellar Objects and the Density of Intergalactic Hydrogen. Vol. 156, 1969, pp. 841-846.

277. Noerdlinger, P. D.: The Dissolution of Early Clusters of Galaxies by Strong Quasi-Stellar Sources. Vol. 159, 1970, pp. L179-L183.

278. Oda, M.; Bradt, H.; Garmire, G.; Spada, G.; Sreekantan, B. V.; Gursky, H.; Giacconi, R.; Gorenstein, P. and Waters, J. R.: The Size and Position of the X-Ray Source in the Crab Nebula. Vol. 148, 1967, pp. L5-L11.

279. Oda, M.; Gorenstein, P.; Gursky, H.; Kellogg, E.; Schreier, E.; Tananbaum, H. and Giacconi, R.: X-Ray Pulsations from Cygnus X-1 Observed from Uhuru. Vol. 166, 1971, pp. L1-L7.

280. Oda, M.; Wada, M.; Matsuoka, M.; Miyamoto, S.; Muranaka, N. and Ogawara, Y.: Dynamic Spectrum Analysis of Cygnus X-1. Vol. 172, 1972, pp. L13-L16.

281. O'Dell, C. R.: Positional Correlations of Galactic Objects and X-Ray Sources. Vol. 147, 1967, pp. 855-857.

282. Oke, J. B. and Sargent, W. L. W.: The Nucleus of the Seyfert Galaxy NGC 4151. Vol. 151, 1968, pp. 807-823.

283. Onyejuba, P. E. and Gaustad, J. E.: Absorption Lines in Neutron-Star Spectra. Vol. 147, 1967, pp. 806-808.

284. Orszag, A. A.: Neutron-Star Atmospheres. Vol. 142, 1965, pp. 473-478.

285. Ostriker, J. P. and Gunn, J. E.: On the Nature of Pulsars. I. Theory. Vol. 157, 1969, pp. 1395-1417.

286. Overbeck, J. W.: Small-Angle Scattering of Celestial X-Rays by Interstellar Grains. Vol. 141, 1965, pp. 864-866.

287. Overbeck, J. W. and Tananbaum, H. D.: Time Variations in Scorpius X-1 and Cygnus XR-1. Vol. 153, 1968, pp. 899-908.

288. Overbeck, J. W.; Womack, E. A. and Tananbaum, H. D.: High-Energy X-Rays from Cygnus XR-1. Vol. 150, 1967, pp. 47-56.

289. Pacini, F.: A Possible Interpretation of the Precursor Pulse in NP 0532. Vol. 169, 1971, pp. L11-L12.

290. Pacini, F.: The Secular Decrease of the Optical and X-Ray Luminosity of Pulsars. Vol. 163, 1971, pp. L17-L19.

291. Palmieri, T. M.; Burginyon, G.; Grader, R. J.; Hill, R. W.; Seward, F. D. and Stoering, J. P.: Soft X-Rays from Two Supernova Remnants. Vol. 164, 1971, pp. 61-66.

292. Palmieri, T. M.; Burginyon, G. A.; Grader, R. J.; Hill, R. W.; Seward, F. D. and Stoering, J. P.: Diffuse Cosmic X-Ray Flux from 0.2 to 2 keV. Vol. 169, 1971, pp. 33-39.

293. Peimbert, M.; Spinrad, H.; Taylor, B. J. and Johnson, H. M.: Photoelectric Scanner Spectrophotometry of Cyg X-2. Vol. 151, 1968, pp. L93-L97.

294. Peterson, L. E. and Jacobson, A. S.: The Spectrum of Scorpius XR-1 to 50 keV. Vol. 145, 1966, pp. 962-965.

295. Pollack, J. B.; Guthrie, P. D. and Shen, B. S. P.: On the Absorption of Gamma Rays by Photons in Pulsars, Quasi-Stellar Objects, and Other Source Objects. Vol. 169, 1971, pp. L113-L116.

296. Polucci, G.; Bradt, H. V.; Mayer, W. and Rappaport, S.: Upper Limits on the Angular Sizes of Three X-Ray Sources in the Sagittarius Region. Vol. 159, 1970, pp. L109-L113.

297. Prendergast, K. H. and Burbidge, G. R.: On the Nature of Some Galactic X-Ray Sources. Vol. 151, 1968, pp. L83-L88.

298. Price, R. E.; Groves, D. J.; Rodrigues, R. M.; Seward, F. D.; Swift, C. D. and Toor, A.: X-Rays from the Magellanic Clouds. Vol. 168, 1971, pp. L7-L9.

299. Ramaty, R.; Boldt, E. A.; Colgate, S. A. and Silk, J.: Ionization and Heating of the Gum Nebula by Energetic Particles from the Vela X Supernova. Vol. 169, 1971, pp. 87-96.

300. Rankin, J. M.; Comella, J. M.; Craft, Jr., H. D.; Richards, D. W.; Campbell, D. B. and Counselman III, C. C.: Radio Pulse Shapes, Flux Densities, and Dispersion of Pulsar NP 0532. Vol. 162, 1970, pp. 707-725.

301. Rao, U. R.; Chitnis, E. V.; Prakasarao, A. S. and Jayanthi, U. B.: X-Ray Flux from Centaurus X-2 in the Energy Range 2-20 keV. Vol. 157, 1969, pp. L127-L132.

302. Rao, U. R.; Jayanthi, U. B. and Prakasarao, A. S.: Energy Spectrum and Time Variation of Sco X-1. Vol. 157, 1969, pp. L133-L137.

303. Rappaport, S.; Bradt, H. V. and Mayer, W.: Interstellar Absorption of 10-Å X-Rays. Vol. 157, 1969, pp. L21-L25.

304. Rappaport, S.; Doxsey, R. and Zaumen, W.: A Search for X-Ray Pulsations from Cygnus X-1. Vol. 168, 1971, pp. L43-L47.

305. Rappaport, S.; Zaumen, W. and Doxsey, R.: On the Location of Cygnus X-1. Vol. 168, 1971, pp. L17-L20.

306. Rappaport, S.; Zaumen, W.; Doxsey, R. and Mayer, W.: GX 349 + 2 and GX 340 + 0: Locations and X-Ray Pulsation Limits. Vol. 169, 1971, pp. L93-L97.

307. Rees, M. J. and Sciama, D. W.: The Detection of Heavy Elements in Intergalactic Space. Vol. 147, 1967, pp. 353-356.

308. Rees, M. J. and Sciama, D. W.: The Kinetic Temperature and Ionization Level of Intergalactic Hydrogen in a Steady-State Universe. Vol. 145, 1966, pp. 6-20.

309. Rees, M. J. and Simon, M.: Evidence for Relativistic Expansion in Variable Radio Sources. Vol. 152, 1968, pp. L145-L148.

310. Riegler, G. R.; Boldt, E. and Serlemitsos, P.: A Comparison of the X-Ray Spectra from Tau XR-1 and the Vicinity of Sgr XR-1. Vol. 153, 1968, pp. L95-L99.

311. Rieke, G. H. and Weekes, T. C.: Production of Cosmic Gamma Rays by Compton Scattering in Discrete Sources. Vol. 155, 1969, pp. 429-437.

312. Rose, W. K.: A Model for the Nova Outburst. Vol. 152, 1968, pp. 245-253.

313. Rose, W. K.: Pulsational Instability in Helium Shell-Burning Stars. Vol. 150, 1967, pp. 193-202.

314. Ruderman, M. A. and Spiegel, E. A.: Galactic Wakes. Vol. 165, 1971, pp. 1-15.

315. Sandage, A.; Westphal, J. A. and Kristian, J.: Results of Five Nights of Continuous Monitoring of the Optical Flux from Sco X-1. Vol. 156, 1969, pp. 927-942.

316. Sandage, A. R.; Osmer, P.; Giacconi, R.; Gorenstein, P.; Gursky, H.; Waters, J.; Bradt, H.; Garmire, G.; Sreekantan, B. V.; Oda, M.; Osawa, K. and Jugaku, J.: On the Optical Identification of Sco X-1. Vol. 146, 1966, pp. 316-322.

317. Sartori, L. and Morrison, P.: Thermal X-Rays from Non-Thermal Radio Sources. Vol. 150, 1967, pp. 385-403.

318. Scargle, J. D.: Activity in the Crab Nebula. Vol. 156, 1969, pp. 401-426.

319. Schild, R. E.: HDE 310376: A Rapid Variable Star Similar to Scorpius XR-1. Vol. 157, 1969, pp. 709-715.

320. Schnopper, H. W.; Bradt, H. V.; Rappaport, S.; Boughan, E.; Burnett, B.; Doxsey, R.; Mayer, W. and Watt, S.: Precise Location of Sagittarius X-Ray Sources with a Rocket-Borne Rotating Modulation Collimator. Vol. 161, 1970, pp. L161-L167.

321. Schreier, E.; Gursky, H.; Kellogg, E.; Tananbaum, H. and Giacconi, R.: Further Observations of the Pulsating X-Ray Source Cygnus X-1 from Uhuru. Vol. 170, 1971, pp. L21-L27.

322. Schreier, E.; Levinson, R.; Gursky, H.; Kellogg, E.; Tananbaum, H. and Giacconi, R.: Evidence for the Binary Nature of Centaurus X-3 from Uhuru X-Ray Observations. Vol. 172, 1972, pp. L79-L89.

323. Schwartz, D. A.: The Isotropy of the Diffuse Cosmic X-Rays Determined by OSO-III. Vol. 162, 1970, pp. 439-444.

324. Schwartz, D. A.; Hudson, H. S. and Peterson, L. E.: The Spectrum of Diffuse Cosmic X-Rays: 7.7 - 113 keV. Vol. 162, 1970, pp. 431-437.

325. Seielstad, G. A. and Weiler, K. W.: One-Dimensional Polarization Distributions Over Four Supernova Remnants at 1418 MHz. Vol. 154, 1968, pp. 817-832.

326. Seward, F.; Chodil, G.; Mark, H.; Swift, C. and Toor, A.: Diffuse Cosmic X-Ray Background Between 4 and 40 keV. Vol. 150, 1967, pp. 845-850.

327. Seward, F. D.; Burginyon, G. A.; Grader, R. J.; Hill, R. W.; Palmieri, T. M. and Stoering, J. P.: X-Rays from Puppis A and the Vicinity of Vela X. Vol. 169, 1971, pp. 515-524.

328. Seward, F. D. and Toor, A.: Search for 8-80 keV X-Rays from the Large Magellanic Cloud and the Crab Nebula. Vol. 150, 1967, pp. 405-411.

329. Shen, C. S. and Berkey, G.: Cosmic Gamma Rays from Inverse Compton Scattering. Vol. 151, 1968, pp. 895-900.

330. Shklovsky, I. S.: On the Nature of the Source of X-Ray Emission of Sco XR-1. Vol. 148, 1967, pp. L1-L4.

331. Shklovsky, I. S.: Pulsar NP 0532 and the Ejection of Relativistic Particles into the Crab Nebula. Vol. 159, 1970, pp. L77-L80.

332. Shukla, P. G. and Wilson, B. G.: Low-Energy Cosmic X-Rays. Vol. 164, 1971, pp. 265-273.

333. Shukla, P. G. and Wilson, B. G.: Erratum: "Low-Energy Cosmic X-Rays." Vol. 168, 1971, p. 319.

334. Shulman, S.; Fritz, G.; Meekins, J. F.; Chubb, T. A.; Friedman, H. and Henry, R. C.: Line Emission in the X-Ray Background. Vol. 166, 1971, pp. L9-L12.

335. Shulman, S.; Fritz, G.; Meekins, J. F.; Friedman, H. and Meidav, M.: X-Ray Intensity Fluctuations in Cygnus XR-1. Vol. 168, 1971, pp. L49-L51.

336. Silk, J.: Forbidden-Line Emission from Hot HI Regions. Vol. 161, 1970, pp. L37-L40.

337. Silk, J.: Intergalactic Clouds. Vol. 160, 1970, pp. 793-799.

338. Silk, J.: The Diffuse X-Ray Background. Vol. 151, 1968, pp. L19-L22.

339. Silk, J.: The Signature of a Pulsar on the Diffuse X-Ray Background. Vol. 166, 1971, pp. L39-L44.

340. Silk, J. and Brown, R. L.: On the Ultraviolet Absorption-Line Spectra Produced by HI Regions. Vol. 163, 1971, pp. 495-502.

341. Silk, J. and Werner, M. W.: Heating of HI Regions by Soft X-Rays. Vol. 158, 1969, pp. 185-192.

342. Smith, L. F. and Aller, L. H.: On the Classification of Emission-Line Spectra of Planetary Nuclei. Vol. 157, 1969, pp. 1245-1254.

343. Sofia, S.: Comments on Shklovsky's Model for the X-Ray Source Sco XR-1. Vol. 149, 1967, pp. L59-L60.

344. Solinger, A. B.: A Blast-Wave Model for the Explosion in the Galaxy M82. Vol. 158, 1969, pp. L25-L30.

345. Spitzer, Jr., L. and Saslaw, W. C.: On the Evolution of Galactic Nuclei. Vol. 143, 1966, pp. 400-419.

346. Spitzer, Jr., L. and Scott, E. H.: Heating of HI Regions by Energetic Particles. II. Integration Between Secondaries and Thermal Electrons. Vol. 158, 1969, pp. 161-171.

347. Starrfield, S. G.: The Rate of Mass Exchange in DQ Herculis. Vol. 161, 1970, pp. 361-363.

348. Stecker, F. W.: The Cosmic Gamma-Ray Spectrum from Secondary-Particle Production in the Metagalaxy. Vol. 157, 1969, pp. 507-514.

349. Stecker, F. W. and Morgan, Jr., D. L.: Metagalactic Gamma Rays from Relativistic-Electron Bremsstrahlung Interactions. Vol. 171, 1972, pp. 201-207.

350. Steigman, G.; Werner, M. W. and Geldon, F. M.: Ionization Equilibrium of Interstellar Nitrogen: A Probe for the Intercloud Medium? Vol. 168, 1971, pp. 373-380.

351. Stein, W. A.: The Millimeter Radiation from 3C 273. Vol. 148, 1967, pp. 689-694.

352. Stepień, K.: Photoelectric Observations of Sco X-1. Vol. 151, 1968, pp. L15-L17.

353. Stief, L. J.; Donn, B.; Glicker, S.; Gentieu, E. P. and Mentall, J. E.: Photochemistry and Lifetimes of Interstellar Molecules. Vol. 171, 1972, pp. 21-30.

354. Sturrock, P. A.: A Model of Pulsars. Vol. 164, 1971, pp. 529-556.

355. Sturrock, P. A.: On the Possibility of Pulsar Action in Quasars. Vol. 170, 1971, pp. 85-92.

356. Tananbaum, H.; Gursky, H.; Kellogg, E. and Giacconi, R.: X-Ray Observations of GX 17+2 from Uhuru. Vol. 168, 1971, pp. L25-L28.

357. Tananbaum, H.; Kellogg, E.; Gursky, H.; Murray, S.; Schreier, E. and Giacconi, R.: Measurement of the Location of the X-Ray Sources Cygnus X-1 and Cygnus X-2 from Uhuru. Vol. 165, 1971, pp. L37-L41.

358. Tarter, C. B. and Salpeter, E. E.: The Interaction of X-Ray Sources with Optically Thick Environments. Vol. 156, 1969, pp. 953-966.

359. Tarter, C. B.; Tucker, W. H. and Salpeter, E. E.: The Interaction of X-Ray Sources with Optically Thin Environments. Vol. 156, 1969, pp. 943-951.

360. Taylor, J. H.; Huguenin, G. R. and Hirsch, R. M.: Search for Pulsed Radio Emission from Scorpius X-1 and Cygnus X-1. Vol. 172, 1972, pp. L17-L19.

361. Thomas, R. M.; Buselli, G.; Clancy, M. C. and Davison, P. J. N.: Balloon Observations of a New-Born X-Ray Source. Vol. 158, 1969, pp. L151-L154.

362. Thomas, R. M.; Buselli, G.; Clancy, M. C. and Davison, P. J. N.: Erratum: "Balloon Observations of a New-Born X-Ray Source." Vol. 161, 1970, p. L155.

363. Toor, A.; Price, R.; Seward, F. and Scudder, J.: X-Ray Source Positions for Cygnus X-1, Cygnus X-2, and Cygnus X-3. Vol. 168, 1971, pp. L15-L16.

364. Toor, A.; Price, R. E. and Seward, F. D.: Limit on Line Emission in the Diffuse X-Ray Background. Vol. 172, 1972, pp. L73-L75.

365. Toor, A.; Seward, F. D.; Cathey, L. R. and Kunkel, W. E.: A Measurement of the Optical and X-Ray Emission from Scorpius X-1 and the X-Ray Diffuse Background. Vol. 160, 1970, pp. 209-213.

366. Trimble, V. L. and Thorne, K. S.: Spectroscopic Binaries and Collapsed Stars. Vol. 156, 1969, pp. 1013-1019.

367. Tucker, W.: Cosmic X-Ray Sources. Vol. 148, 1967, pp. 745-765.

368. Tucker, W. H.: A Blast-Wave Model for the Vela X Supernova Remnant and the Origin of the Gum Nebula. Vol. 167, 1971, pp. L85-L87.

369. Tucker, W. H.: Physical Conditions in Sco X-1. Vol. 149, 1967, pp. L105-L109.

370. Tucker, W. H.: The X-Ray Emission from Supernova Outbursts and the Diffuse X-Ray Background. Vol. 161, 1970, pp. 1161-1163.

371. Tucker, W. H. and Gould, R. J.: Radiation from a Low-Density Plasma at 10^{6° - 10^{8°K. Vol. 144, 1966, pp. 244-258.

372. Turnrose, B. E. and Rood, H. J.: On the Hypothesis that the Coma Cluster is Stabilized by a Massive, Ionized Intergalactic Gas. Vol. 159, 1970, pp. 773-789.

373. Usher, P. D.: Secular Behavior of a Blue Object Near Cygnus X-2. Vol. 149, 1967, pp. L19-L20.

374. Van Horn, H. M.; Richardson, M. B. and Hansen, C. J.: Radial Pulsations of Pre-White-Dwarf Stars. I. Linear Quasi-Adiabatic Analysis. Vol. 172, 1972, pp. 181-199.

375. Verma, S. D.: High Energy Electrons and Emission of the Omnidirectional Synchrotron Radiation in Radio-Frequency and X-Ray Regions. Vol. 152, 1968, pp. 537-544.

376. Vette, J. I.; Gruber, D.; Matteson, J. L. and Peterson, L. E.: A New Component of Cosmic Gamma Rays Near 1 MeV Observed by the ERS-18. Vol. 160, 1970, pp. L161-L170.

377. Visvanathan, N.: Polarization Observations in the Radio Galaxy 3C 371 and the X-Ray Source Cyg X-2. Vol. 150, 1967, pp. L149-L151.

378. Wade, C. M. and Hjellming, R. M.: Further Radio Observations of Scorpius X-1. Vol. 170, 1971, pp. 523-528.

379. Wade, C. M.; Hjellming, R. M.; Kellermann, K. I. and Wardle, J. F. C.: Radio Emission from the Nucleus of NGC 5128. Vol. 170, 1971, pp. L11-L13.

380. Wallerstein, G.: A Possible Identification of Lac XR-1 with the Wolf-Rayet Binary HD 211853. Vol. 151, 1968, pp. L121-L124.

381. Wallerstein, G. and Silk, J.: Interstellar Gas in the Direction of the Vela Pulsar. Vol. 170, 1971, pp. 289-296.

382. Webber, W. R. and Reinert, C. P.: Balloon-Borne Studies of X-Ray Emission from Selected Regions in the Northern Sky. Vol. 162, 1970, pp. 883-889.

383. Werner, M. W.; Silk, J. and Rees, M. J.: Heating of HI Regions by Soft X-Rays. II. The Effect of Galactic Soft X-Ray Sources. Vol. 161, 1970, pp. 965-977.

384. Westphal, J. A.; Sandage, A. and Kristian, J.: Rapid Changes in the Optical Intensity and Radial Velocities of the X-Ray Source Sco X-1. Vol. 154, 1968, pp. 139-156.

385. Weymann, R.: Possible Thermal Histories of Intergalactic Gas. Vol. 147, 1967, pp. 887-900.

386. Weymann, R.: The Energy Spectrum of Radiation in the Expanding Universe. Vol. 145, 1966, pp. 560-571.

387. Wilson, R. E.: A Model of Epsilon Aurigae. Vol. 170, 1971, pp. 529-539.

388. Wolf, R. A.: Some Effects of the Strong Interactions on the Properties of Neutron-Star Matter. Vol. 145, 1966, pp. 834-841.

389. Wolfe, A. M.: New Limits on the Shear and Rotation of the Universe from the X-Ray Background. Vol. 159, 1970, pp. L61-L67.

390. Wolfe, A. M.: Some Implications of the Anisotropy Measured in the Microwave Background. Vol. 156, 1969, pp. 803-813.

391. Wolfe, A. M. and Burbidge, G. R.: Discrete Source Models to Explain the Microwave Background Radiation. Vol. 156, 1969, pp. 345-371.

392. Wolff, R. S.; Angel, J.R.P.; Novick, R. and Vanden Bout, P.: Search for Polarization in the X-Ray Emission of the Crab Nebula. Vol. 160, 1970, pp. L21-L25.

393. Woltjer, L.: The Nature of Pulsating Radio Sources. Vol. 152, 1968, pp. L179-L180.

394. Woltjer, L.: X-Rays and Type I Supernova Remnants. Vol. 140, 1964, pp. 1309-1313.

395. Zeldovich, Ya. B. and Guseynov, O. H.: Collapsed Stars in Binaries. Vol. 144, 1966, pp. 840-841.

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APPROVAL

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By Robert M. Wilson

The information in this report has been reviewed for security classification. Review of any information concerning Department of Defense or Atomic Energy Commission programs has been made by the MSFC Security Classification Officer. This report, in its entirety, has been determined to be unclassified.

This document has also been reviewed and approved for technical accuracy.

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